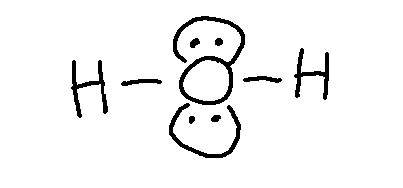
**2.3 – VSEPR Theory**

VSEPR – Valence Shell Electron Pair Repulsion 🡪 Often pronounced “vesspur”

**Main idea** – electron pairs ­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ whether they are in chemical bonds (bond pairs) or unshared (lone pairs). Electron pairs assume orientations about an atom that will then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Using this theory, we can then predict the shape of just about any molecule.



i.e. H2O

* Lone pairs have large repulsion - Lone pairs repulse bond pairs to
* Need to minimize make bent molecule.

Strongest repulsions: lone pair-lone pair > lone pair-bond pair > bond pair-bond pair

**Applying VSEPR Theory**

1. Draw a plausible \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the molecule or polyatomic ion.
2. Determine the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ around the central atom, and identify them as being either \_\_\_\_\_\_\_\_\_\_\_\_ electron groups or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electrons.
3. Establish \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ around the central atom – linear, trigonal-planar, tetrahedral, trigonal-bipyramidal, or octahedral. (Refer to chart below)
4. Determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the positions around the central atom occupied by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (\*\*\*Therefore, the geometry when only taking into account \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\*\*\*). Refer to table 11-1.

**Electron Group Geometries**

|  |  |
| --- | --- |
| **Number of electron groups** | **Geometry** |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |

**VSEPR Notation**

When determining the molecular geometry in step 4 above, we will write out the VSEPR notation from the information that we have obtained. This notation uses the following abbreviations:

A – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

X – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; groups of electrons bonded to A

E – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electrons around central atom

Let’s work through an example…

**ICl4-**

1. Number of valence electrons:

1. Number of bond groups =

Number of lone pair groups =